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Education and Training

BA	Geological Sciences	1979	University of Geneva, Switzerland
MS	Geological Sciences (Geophysics)	1980	University of Geneva, Switzerland
Ph.D.	Geological Sciences (Geochemistry)	1987	University of Oregon

Research and Professional Experience

1998-present	Staff Geological Scientist, Lawrence Berkeley National Laboratory
1993-1997	Geochemist/Hydrogeologist, DBA AquaLogic (private consultant)
1988-1998	Senior Project Scientist, International Technology Corporation, Irvine, CA
1987-1988	Post-Doctoral Research Associate (Geochemistry), University of Oregon
1981-1987	Research Assistant (Geochemistry), University of Oregon

Recent and Selected Publications

Spycher, N., Pruess, K., 2009. A Phase-partitioning model for CO_2-brine mixtures at elevated temperatures and pressures: Application to CO_2-enhanced geothermal systems. *Transport in Porous Media* (in press).

Moberly J.G., Borch T., Sani R.K, **Spycher N.F.**, Sengor S., Ginn T.R., Peyton B., 2009. Heavy metal–mineral associations in Coeur d'Alene River sediments: a synchrotron-based analysis. *Water, Air, Soil Pollut.*, 201, 195–208.

Zhang, G., **Spycher, N.**, Sonnenthal, E., Steefel, C. And Xu, T., 2008. Modeling reactive multiphase flow and transport of concentrated solutions, *Journal of Nuclear Technology*, 164(2), 180 – 195.

Sengor, S.S., **Spycher, N.F.**, Ginn, T.R., Sani, R.K., and B. Peyton, B., 2007. Biogeochemical reactive-diffusive transport of heavy metals in Lake Coeur d'Alene sediments. *Applied Geochemistry*, 22, 2569-2594.

Sengör, S.S., **Spycher, N.F.**, Ginn, T.R., Moberly, J., Peyton, B., & Sani, R.K., 2007. Reductive dissolution and metal transport in Lake Coeur d'Alene sediments. In *Water-Rock Interaction, WRI-12* (Bullen T. and Wang Y., eds.), Taylor & Francis, New York, 895-899.

Pruess, K. and **Spycher, N**., 2007. ECO2N – A Fluid property module for the TOUGH2 code for studies of CO_2 storage in saline aquifers. *Energy Conversion and Management*, 48 (6), 1761-1767.

Mukhopadhyay S., Sonnenthal E. L., and **N. Spycher**, 2006. Modeling coupled thermal-hydrological-chemical processes in the unsaturated fractured rock of Yucca Mountain, Nevada: Heterogeneity and seepage. *Physics and Chemistry of the Earth*, 31, 626-633.

Xu, T., Sonnenthal E., **Spycher N.**, and Pruess, K., 2006, TOUGHREACT - A simulation program for non-isothermal multiphase reactive geochemical transport in variably saturated geologic Media: applications for geothermal injectivity and CO2 geologic sequestration. *Computers and Geosciences*, 32, 145-165.

Spycher N. and Larkin R., 2005. A study on chemical interaction between waste, native fluid, and host rock during deep well injection. Underground Injection of Industrial and Hazardous Waste (C.F. Tsang and J.A. Apps, eds.), *Developments in Water Science*, 52, 313-326.

Spycher N. and Pruess K., 2005. CO_2-H_2O Mixtures in the Geological Sequestration of CO_2. II. Partitioning in chloride brines at 12-100°C and up to 600 bar. *Geochimica Cosmochim. Acta, 69, 3309-3320.*

Spycher N., Sonnenthal E., Kneafsey T., Dobson P., 2004. An integrated approach to predict coupled processes at a nuclear waste repository. In *Water-Rock Interaction, WRI-11* (Wanty R.B. and Seal R.R., eds.), Balkema Publishers, New York, pp. 995-998.

Spycher N., Sonnenthal E., and J. Apps, 2003. Prediction of fluid flow and reactive transport around potential nuclear waste emplacement tunnels at Yucca Mountain, Nevada. *J. of Contaminant Hydrology,* 62-63, 653-674.

Spycher N., Pruess K., and Ennis-King J., 2003. CO_2-H_2O Mixtures in the Geological Sequestration of CO_2. I. Assessment and calculation of mutual solubilities from 12 to 100°C and up to 600 bar. *Geochim. Cosmochim. Acta,* Vol. 67, 3015-3031.

Xu, T., Sonnenthal, E., **Spycher, N.**, Pruess, K., and G. Brimhall, 2001. Modeling multiphase non-isothermal fluid flow and reactive geochemical transport in variably saturated fractured rocks: 2. Applications to supergene copper enrichment and hydrothermal flows, *American Journal of Science,* 301, 34-59.

Spycher N.F. and M.H. Reed, 1989. Evolution of a Broadlands-type epithermal ore fluid along alternative P-T paths: implications for the transport and deposition of base, precious, and volatile metals. *Economic Geology*, 84, 328-359.

Spycher N.F. and M.H. Reed, 1989. As(III) and Sb(III) sulfide complexes: An evaluation of stoichiometry and stability from existing experimental data. *Geochimica Cosmochim. Acta*, 53, 2185-2194.

Reed M. H. and **N. F. Spycher**, 1984. Calculation of pH and mineral equilibria in hydrothermal waters with application to geothermometry and studies of boiling and dilution. *Geochimica et Cosmochimica Acta*, vol. 48, p.1479-1492.

Research Areas

Dr. Spycher has over fifteen years of applied research experience in aqueous geochemistry and water/rock/gas interactions, including the development and application of multicomponent geochemical and reactive transport models to study metal transport and deposition processes in a variety of geochemical environments. He is a co-author of the CHILLER/SOLVEQ geochemical modeling codes and of the TOUGHREACT reactive transport simulator, which are being used internationally at many academic and private research institutions. His current research activities focus on developing biogeochemical conceptual and numerical models to understand water/gas/rock/sediment interactions in various types of subsurface environments. He is also working on the development of gas solubility correlations for carbon dioxide sequestration and geothermal studies, and has developed and compiled thermodynamic data for use with geochemical models, including data for the aqueous speciation of metals such as arsenic, antimony and mercury. He is actively involved in projects involving reactive transport modeling at various scales at contaminated DOE sites, uranium reoxidation by iron (hydr)oxides, carbon sequestration, metal cycling in contaminated lake sediments, and the study of coupled thermal, hydrological, and chemical processes related to nuclear waste. Besides his academic background, Dr. Spycher has extensive experience in the field of environmental hydrogeology and hydrogeochemistry, including ten years of consulting experience dedicated to the remedial investigation of contaminated sites. His investigations included predicting the fate of metals, spilled fuels, and solvents in the subsurface using field measurements and modeling techniques. He has worked with geochemical speciation and surface complexation models to evaluate metal mobility in specific contaminated environments, as well as flow and transport models for risk assessments.